1952

An experimental study of the Effect of Puppetry on Pupil Growth in School Achievement, Personal Adjustment, and Manipulative Skill

Albert Edward Haak
College of William & Mary - School of Education

AN EXPERIMENTAL STUDY OF THE EFFECT OF PUPPETRY ON PUPIL GROWTH IN SCHOOL ACHIEVEMENT, PERSONAL ADJUSTMENT, AND MANIPULATIVE SKILLS

A Thesis

Submitted in Partial Fulfillment

of the Requirements of

The College of William and Mary

For the Degree

Master of Arts

by

Albert Edward Haak

June 1952

ACKNOWLEDGEMENTS

To Mr. Richard B. Brooks, Dr. Kenneth H. Cleeton, and Dr. Howard K. Holland, the members of his committee, for their suggestions and help in the preparation of this report;

To Dr. R. Lee Martin for his advice and encouragement;

To Dr. V. M. Mulholland, Principal of Matthew Whaley School, Williamsburg, Virginia, Miss Eunice Hall, and David Pulley, teachers at Matthew Whaley School for their encouragement and cooperation during the study;

To the pupils of the Eighth Grade, 1949-50 of Matthew Whaley School, for their willingness to participate in the study;

To his wife, Julia Kimber Haak, whose help and understanding during the study and preparation of the report really made the study possible.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	THE PROBLEM AND RELATED EXPERIMENTS	1
	Introduction	1
	The problem	1
	Definition of terms and limitation of problem	2
	Related experiments	2
	The problem in relation to previous studies	4
	Organization of report	5
II.	THE EXPERIMENTAL DESIGN	6
	Selection of school and grade	6
	Selection of tests and equating the groups	7
	Control of experiment	10
	Account of experiences in the group	12
	Experimental group	12
	Control group	13
	Factors possibly affecting the experiment	13
III.	PRESENTATION OF DATA	15
IV.	DISCUSSION OF RESULTS	17
	Incidental findings when testing for growth within groups	18
V.	CONCLUSIONS	22
	Final evaluation	23

CHAPTER PAGE

BIBLIOGRAPHY 26

APPENDIX A. Related Experiments 29

APPENDIX B. Method of Puppet Construction 32

APPENDIX C. Resume of Activities 35

APPENDIX D. Formulas 39

LIST OF TABLES

TABLE		PAGE
I.	The Mean, Mean Difference, Standard Error of Mean Difference of the Experimental and Control Group, Initial Testing, Progressive Achievement Test	9
II.	The Mean, Mean Difference, Standard Error of Mean Difference of the Experimental and Control Group, Initial Testing, California Test of Personality and Minnesota Rate of Manipulation Test	11
III.	The Mean, Mean Difference, Standard Error of Mean Difference of the Experimental and Control Group, Final Testing of Achievement, Personal Adjustment, and Manipulation	16
IV.	The Mean, Mean Difference, Standard Error of Mean Difference of the Experimental Group, Initial and Final Testing of Achievement, Personal Adjustment, and Manipulation.	19
V.	The Mean, Mean Difference, Standard Error of Mean Difference of the Control Group, Initial and Final Testing of Achievement, Personal Adjustment, and Manipulation	20

CHAPTER I

THE PROBLEM AND RELATED EXPERIMENTS

I Introduction

Puppetry has been used advantageously in classrooms in many schools as a teaching technique.[1] In fact, one can go back to the ancient Greeks and Romans and find that they used puppets as a medium of teaching religion to the people.[2] Reports of a subjective nature written by enthusiastic teachers are abundant in periodical literature.[3]

II Problem

This experimental study was an attempt to measure objectively the effectiveness of puppetry as an extracurricular activity in aiding pupil growth in school achievement, personal adjustment, and manual dexterity. Stated as a hypothesis: puppetry, when experienced as an extracurricular activity, will increase pupil growth in school achievement,

---

[1] C. C. Crawford and Lillian Grey, "Measured Results of Activity Teaching," National Education Journal, 20:270, October, 1931.

[2] Bessie A. Ficklen, A Handbook of Fist Puppets (New York: Frederick A. Stokes Company, 1935), p. 22

[3] I. Smith, "Puppetry in the Classroom," Elementary English Review, 10:219-22, November, 1933.

personal adjustment, and manipulative skills.

III Definition of Terms and Limitation of Problem

The term "school achievement" is used here in a limited sense to mean the acquisition of fundamental skills of language, arithmetic, and science; the term "personal adjustment" in the study will mean the pupils' growth in social and self adjustment; and the term "manipulative skill" is used in a limited sense to mean the finger and arm manipulation of the pupils. Puppetry as the experimental variable in the study is limited and simultaneously defined as:

1. Making fist puppets and puppet costumes
2. Writing or adapting scripts
3. Preparing scenery and properties
4. Producing puppet shows

Puppetry was extracurricular, for the activity was not compulsory nor was it a part of the organized classroom work.

The experiment was conducted in an eighth grade of the Matthew Whaley School, Williamsburg, Virginia, during the school year 1949-1950.

IV Related Experiments

Reports of only two related experiments on puppetry in the classroom could be found. To help clarify the purpose

and more definitely limit the scope of the present study, these two experiments are reviewed.

The first experiment was made in a fifth grade of a departmentalized elementary school in Los Angeles, California, in 1931 [4] and had the purpose of attempting to find the effectiveness of puppetry activity in teaching fundamental language skills. This single group experiment was conducted one hour per day for one semester in an English class and culminated in the production of one puppet show. In the experiment, puppetry activity included many elements, such as history of puppetry, reading of literature to find material for the one puppet show, oral English in discussion of plans and advertising the play, written English in preparation of a script, writing for information, and writing critical reviews of the rehearsals. The test data indicated that puppetry, when used as an activity in classroom teaching, was effective in aiding pupil growth in English fundamentals. The full tabulated results of the study appear in Appendix A, page 30.

The second study was made in ten New York City schools during the school year 1946-1947. Laboratory puppetry experiments were conducted in grades one through nine for one hour a day for two semesters. The results according to the New York Board of Education, sponsor of these experiments,

---

[4] Crawford, op. cit., p. 270

were that:

> an educational program which includes the type of experiences offered by puppetry, will help the pupil to:
>
> .discover and develop his aptitudes and talents.
> .express himself creatively and imaginatively.
> .develop and use an effective vocabulary ...
> .extend manipulative skills.
> . . . . . .
> .develop individual security ...
> . . . . . .
> .develop self-control, consideration for others...[5]

The data for the study were obtained through observation by the various teachers and educators connected with the project; no mention was made in the report of the use of tests to obtain objective data. The complete results of the New York study will be found in Appendix A, page 31.

V The Problem in Relation to Previous Studies

The Los Angeles study used tests for measuring the results but measured language skills only. The New York study appears to have been too large an undertaking to be closely controlled. Furthermore, the method of obtaining and stating the results left something to be desired in terms of specificity.

If puppetry when used in the classroom was beneficial

---

[5] Puppetry In The Curriculum. (Board of Education of the City of New York. Curriculum Bulletin, 1947-1948 Series, No. 1)

to pupil growth in the English fundamentals as found in the Los Angeles study or in the areas mentioned in the results of the New York study, how effective would puppetry be as an extracurricular activity in regard to:

1. Aiding pupil growth in fundamental skills of reading, language, and arithmetic?

2. The development of self-control and individual security in any amount measurable by a group personality test?

3. Extension of manipulative skills in any amount measurable by a rate of manipulation test?

The present study was made in an attempt objectively to answer these questions with quantitative data.

VI Organization of Report

The remainder of the report is organized as follows: Chapter II presents the experimental design; Chapter III contains the presentation and analysis of data; Chapter IV is the discussion of results; and Chapter V presents the conclusions of the study.

CHAPTER II

THE EXPERIMENTAL DESIGN

I Selection of School and Grade

To test the hypothesis of this investigation, namely, puppetry when experienced as an extracurricular activity will increase pupil growth in school achievement, personal adjustment, and manipulative skills, a parallel group experiment was designed. The parallel group method is an attempt to overcome the limitation of the one group method and is more valid, providing the control and experimental groups are equal.[6]

First it was necessary to arrange with the officials of the Matthew Whaley School in Williamsburg, Virginia for permission to conduct the experiment during the school year 1949-1950.

The eighth grade was chosen because:

1. The number of pupils in the grade was great enough to facilitate division of the class into convenient and workable control and experimental groups.

2. The class was occupying two rooms and thus space

---

[6] Carter Victor Good, A. S. Barr, and Douglas E. Skates, The Methodology of Research (New York: D. Appleton-Century Company, Inc. 1941) pp. 493-94.

requirements of the experiment could easily be met.

3. The teachers involved were very interested in having the experiment made in their grade.

II Selection of Tests and Equating the Groups

Reputable tests were required to measure, in so far as objective tests can measure, the factors of school achievement, personal adjustment, and manipulative skills as a basis for equating the groups and to measure the effectiveness of the experimental variable, namely, extracurricular puppetry activity. The three tests chosen to measure the factors of achievement, personal adjustment, and manipulative skills were the Progressive Achievement Test,[7] the California Test of Personality,[8] and the Minnesota Rate of Manipulation Test,[9] respectively. The tests were administered in October, 1949, and in May, 1950. These tests were used as measuring instruments to indicate the growth of a pupil in specific areas at the time of the testing. The difference between the scores

---

[7] Ernest W. Tiegs and Willis W. Clark, Progressive Achievement Tests, Los Angeles: California Test Bureau, 1943.

[8] Willis W. Clark, Ernest W. Tiegs, and Louis P. Thorpe, California Test of Personality, Los Angeles: California Test Bureau, 1942.

[9] W. A. Ziegler, Minnesota Rate of Manipulation Test, Minneapolis: Educational Test Bureau, 1939.

in the initial testing and the final testing should give an indication of the growth occurring during the time interval of the experiment.

Two equal groups had to be selected within the grade. The groups were equated on the factor of achievement as follows:

1. The Progressive Achievement Test was administered to the sixty-nine pupils of the eighth grade. Three pupils were dropped because they were special students. The factor of intelligence was not measured especially for the experiment since intelligence quotient, age, and sex data came from the official school records.

2. After the testing, thirty-two pupils interested in puppetry were listed as the tentative puppet activity group. The balance of the class was considered the tentative control group.

3. The range and mean of the two groups' achievement test scores were calculated and compared by inspection.

4. Several students were requested to join and others were requested to leave the puppet group; after the shifting, the number in the puppet group was twenty-nine and the number in the control group was thirty-seven.

5. The range, mean, and standard deviation of each group's achievement test scores were computed. The difference

between the two achievement test means was tested for significant difference by use of the critical ratio. Data revealing how nearly equal the two groups were on the factor of achievement are presented in the following table.

TABLE I

THE MEAN, MEAN DIFFERENCE, STANDARD ERROR OF MEAN DIFFERENCE OF THE EXPERIMENTAL AND CONTROL GROUP INITIAL TESTING, PROGRESSIVE ACHIEVEMENT TEST

Test	Experimental Group Mean (Raw Scores)	Control Group Mean (Raw Scores)	Difference of Means	Standard Error of Mean Difference	Critical Ratio
Reading	95.03	96.13	1.10	4.293	.256
Arithmetic	86.10	87.83	1.73	3.742	.462
Language	71.65	68.51	3.14	3.265	.961
Total Test	252.79	252.49	.30	9.189	.033

For the number of cases involved in the smaller group a critical ratio of 2.05 was required for rejection of the null hypothesis on a five per cent level of confidence; a critical ratio of 2.76 was required for a one per cent level of confidence.[10] The critical ratio of .033 indicated the

[10] Henry E. Garrett, Statistics in Psychology and Education (New York: Longmans, Green and Co., 1947), p. 199.

difference between the two groups on the factor of achievement was not significant. The two groups were designated the experimental or puppet group and the control group, and for this report these terms are used.

The critical ratios presented in the following Table II indicate the two groups did not differ significantly on the factors of personal adjustment and manipulative skill as measured by the tests selected for the experiment. The highest critical ratio, 1.41, is found in "total manipulation" test data comparison. McCall's statement that, "equating on one basis tends to make the groups have approximately equivalent means and variabilities on any other basis, even though particular pupils do not pair on all bases,"[11] seems to be substantiated in equating the two groups of the experiment.

III Control of Experiment

To control the experimental variable as much as possible and to lessen the effects of uncontrolled factors, experience with puppetry was limited to seventy experimental periods and to the experimental group. During the remainder of the school day and the remaining two activity periods per week, the contacts and experiences were the same for all the pupils in the class.

---

[11] William Anderson McCall, How to Experiment in Education (New York: The Macmillan Company, 1923) p. 58.

TABLE II

THE MEAN, MEAN DIFFERENCE, STANDARD ERROR OF MEAN DIFFERENCE OF THE EXPERIMENTAL AND CONTROL GROUP, INITIAL TESTING, CALIFORNIA TEST OF PERSONALITY AND MINNESOTA RATE OF MANIPULATION TEST

Test	Experimental Group Mean (Raw Scores)	Control Group Mean (Raw Scores)	Difference of Means	Standard Error of Mean Difference	Critical Ratio
California Test of Personality					
Self adjustment	69.97	71.56	1.59	2.908	.546
Social adjustment	75.59	74.62	.97	2.779	.349
Total adjustment	145.55	146.18	.63	5.424	.011
Minnesota Rate of Manipulation					
Placing	231.44	235.64	4.20	4.412	.951
Turning	183.82	190.13	6.31	4.661	1.353
Total Manipulation	415.27	425.78	10.51	7.447	1.41

IV Account of Experiences in the Groups

While the experimental group was working in puppetry, no set plan of activity was established for the control group. A resume of the activity within each group follows.

Experimental group. The experimental group was divided into five "producing groups" each responsible for producing two puppet shows during the experiment. Each "producing group" elected one member to be the director and decided upon a name for their group and the plays they would produce. Instruction in fist puppet construction and production methods was given by the investigator. The puppets were made in the manner suggested by Ficklen.[12] (The complete method may be found in Appendix B, page 33). Every pupil was required to make at least two puppets during the experiment, one for each production of his group.

Five productions were presented in February, 1950, to the experimental group, the lower grades at Matthew Whaley School, and to the high school. Five productions were also presented in May, but only to the experimental group.

A complete account of the puppetry activity during the experiment appears in Appendix C, page 37.

---

[12] Ficklen, op. cit., p. 37-52.

Control group. The control group participated in such activities as map making, basketball, baseball, library, reading, and study during the seventy periods the experimental group was engaged in puppetry activity. An account of the control group's activity appears in Appendix C, page 36.

V Factors Possibly Affecting the Experiment

Several factors entered the experimental design that were uncontrollable.

The only time the experiment could be set up was during the school activity period which was forty minutes in length. After subtracting the time spent in covering and uncovering the desks, distributing and packing materials, and setting up and dismantling the puppet stage, when it was used, the period in which the experimental factor was allowed to work was thirty minutes. The relatively short period, three out of five days a week, might possibly have been too short a time for the experimental variable to have effect. On the other hand, if puppetry is effective in promoting pupil growth, the investigator is of the opinion that in the length of time the experiment was conducted, the effects of puppetry activity would appear in the resulting data.

One disadvantage of conducting the experiment during the activity period was the competition for the pupils'

interest in the form of special school assemblies, elections, and inter-class basketball and baseball games.

A lack of storage space in the classroom available for puppet materials necessitated leaving partially finished puppet heads to dry on the window sills. Thus, many accidents ensued because of inquisitive students in the room during other class periods, which resulted in time lost to make the necessary repairs.

CHAPTER III

PRESENTATION OF DATA

Data comparing the experimental and control groups at the end of the experiment are presented in Table III. Since a critical ratio of 2.05 was required to indicate a significant difference between means of the various tests at a five per cent level of confidence and a critical ratio of 2.76 was required for a one per cent level of confidence as established in Chapter I, the critical ratio of the "turning subtest" of the Minnesota Rate of Manipulation Test indicates a significant difference between the experimental and control group on a one per cent level of confidence for the critical ratio was 2.78. The data further indicates that the experimental group was significantly different from the control group on the factor of "total manipulation" on a five per cent level of confidence for the critical ratio was 2.58. No other critical ratios presented in Table III were large enough to indicate differences between the groups on the other factors listed which were not accountable by chance.

TABLE III

THE MEAN, MEAN DIFFERENCE, STANDARD ERROR OF MEAN DIFFERENCE OF THE EXPERIMENTAL AND CONTROL GROUP, FINAL TESTING OF ACHIEVEMENT, PERSONAL ADJUSTMENT, AND MANIPULATION

Test	Experimental Group Mean (Raw Scores)	Control Group Mean (Raw Scores)	Difference of Means	Standard Error of Mean Difference	Critical Ratio
Progressive Achievement Test					
Reading	103.68	107.75	4.07	5.562	.731
Arithmetic	97.37	99.35	1.98	3.955	.500
Language	80.79	78.35	2.44	3.273	.745
Total Achievement	281.86	285.46	3.60	10.058	.358
California Test of Personality					
Self-adjustment	67.51	69.43	1.92	3.084	.622
Social adjustment	73.89	74.62	.73	2.870	.254
Total adjustment	141.41	144.05	2.64	5.587	.472
Minnesota Rate of Manipulation Test					
Placing	219.20	224.94	5.74	3.743	1.53
Turning	161.68	171.89	10.21	3.662	2.78
Total Manipulation	380.89	396.83	15.94	6.159	2.58

CHAPTER IV

DISCUSSION OF RESULTS

The data presented in Chapter III, when reviewed in terms of pupil growth, indicated the experimental group evidenced more growth in manipulative skills during the time interval of the experiment than did the control group.

The"turning subtest" of the Minnesota Rate of Manipulation Test attempted to measure finger manipulative skill and finger coordination, while the "placing subtest" was concerned primarily with arm manipulation skill. It would seem logical that growth in finger manipulative skill would be greater, for puppetry requires more use of the fingers than the arms. The growth in arm manipulation in the experimental group, though not significantly different from the growth in arm manipulation of the control group when considered as a separate factor, appears to have contributed to the significant growth of total manipulation skill in the experimental group.

Growth in school achievement in the experimental group was not significantly different from the school achievement growth of the control group during the time of the experiment. The data may indicate that incidental learning experiences of reading, language, and arithmetic are not prevalent enough in

extracurricular puppetry activity, without special stress, to aid growth in school achievement; or the data may indicate that the test was faulty as a measuring instrument as far as school achievement is concerned.

Test data reveal no significantly greater growth in the experimental group in personal adjustment, during the experiment, when compared to the control group data.

Incidental findings when testing for growth within groups. To check the growth of each group in the factors of achievement, personal adjustment, and manipulative skill, the initial and final test data of the experimental group were tested for significant differences by use of the critical ratio. The data of the experimental group is presented in Table IV. Significant growth was indicated in all phases of the achievement test except reading. No significant growth in personal adjustment was indicated in the experimental group's personality test data.

The initial and final test data of the control group were similarily compared by use of critical ratio. The results of the comparison are presented in Table V, page 20. The critical ratios indicate significant growth occurred in all phases measured by the achievement test and on all phases measured by the manipulation test. As in the experimental group, no significant growth in personal adjustment was

TABLE IV

THE MEAN, MEAN DIFFERENCE, STANDARD ERROR OF MEAN DIFFERENCE OF THE EXPERIMENTAL GROUP, INITIAL AND FINAL TESTING OF ACHIEVEMENT, PERSONAL ADJUSTMENT, AND MANIPULATION

Test	Initial Test Mean (Raw Scores)	Final Test Mean (Raw Scores)	Difference of Means	Standard Error of Mean Difference	Critical Ratio
Progressive Achievement Test					
Reading	95.03	103.68	8.65	6.241	1.385
Arithmetic	86.10	97.37	11.27	4.085	2.758
Language	71.65	80.79	9.14	3.529	2.589
Total Achievement	252.79	281.86	29.07	10.90	2.666
California Test of Personality					
Self adjustment	69.97	67.51	2.46	3.456	.711
Social adjustment	75.59	73.89	1.70	2.722	.624
Total adjustment	145.55	141.41	4.14	5.897	.702
Minnesota Rate of Manipulation Test					
Placing	231.44	219.20	12.24	4.174	2.932
Turning	183.82	161.68	22.14	3.860	5.735
Total Manipulation	415.27	380.89	34.38	6.970	4.932

TABLE V

THE MEAN, MEAN DIFFERENCE, STANDARD ERROR OF MEAN DIFFERENCE, OF THE CONTROL GROUP, INITIAL AND FINAL TESTING OF ACHIEVEMENT, PERSONAL ADJUSTMENT, AND MANIPULATION

Test	Initial Test Mean (Raw Scores)	Final Test Mean (Raw Scores)	Difference of Means	Standard Error of Mean Difference	Critical Ratio
Progressive Achievement Test					
Reading	96.13	107.75	11.62	3.225	3.603
Arithmetic	87.83	99.35	11.52	3.613	3.188
Language	68.51	78.35	9.84	2.985	3.296
Total Achievement	252.49	285.46	32.97	8.167	4.036
California Test of Personality					
Self adjustment	71.56	69.43	2.13	2.454	.867
Social adjustment	74.62	74.62	0.00	2.923	.000
Total adjustment	146.18	144.05	2.13	5.084	.418
Minnesota Rate of Manipulation Test					
Placing	235.64	224.94	10.70	4.006	2.670
Turning	190.13	171.89	18.24	4.498	4.055
Total Manipulation	425.78	396.83	28.95	6.695	4.324

indicated by the test data of the control group.

Since both the control and the experimental groups remained constant in the factor of personal adjustment, perhaps growth in personal adjustment is not significantly great enough in a seven months period of time to measure, or perhaps the group personality test was too gross an instrument to measure what growth may have occurred.

CHAPTER V

CONCLUSIONS

The quantitative data of this experiment indicates significant pupil growth in manipulative skill did occur as a result of extracurricular puppetry activity. It is reasonable to conclude that extracurricular puppetry activity as used in the study affected pupil growth in such manipulative skills as measured by the Minnesota Rate of Manipulation Test.

The data indicate that the experimental group became more adept or skillful in manipulation; it does not indicate that there was any growth in manipulative capacity or manual dexterity in the experimental group.

The results of the experiment do not uphold the remaining parts of the hypothesis regarding pupil growth in school achievement and personal adjustment, as measured by the tests used.

In so far as the California Progressive Achievement Test did measure growth in achievement in each group, it seems reasonable to conclude that the incidental experiences of reading, arithmetic, and language in extracurricular puppetry are not present without special emphasis to aid pupil growth in achievement in any measurably significant amount.

The experimental test data on the factor of personal adjustment leads one to conclude that either:

1. There was no pupil growth in personal adjustment in the time interval of the experiment or

2. The test used was too gross to measure the growth in personal adjustment that was present.

The latter conclusion is most tenable.

Final evaluation. The experiment was considered successful regardless of the physical limitation of the room, the period of day the activity was held, or the fact that the hypothesis was only partially upheld by the results of the study.

The cooperation of everyone connected in any way with the experiment was very good.

Perhaps the experiment would have been more valuable if puppetry had been compared with another activity as an aid to pupil growth, rather than attempting to find the effectiveness of puppetry as a single independent variable. Physical limitations of the school building prevented the possibility of conducting an experiment containing two experimental groups.

Further studies would be most beneficial in attempting to measure the effectiveness of puppetry as an aid to personal adjustment. A more sensitive personality test would have

to be used to measure the results of group cooperation, establishment of confidence in the shy pupil, and other subjective growths that any one working with puppetry is certain do occur but cannot measure in any quantitative manner.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Abelson, H. H., The Art of Educational Research. Yonkers-on-Hudson, New York: World Book Company, 1933. 332 pp.

Buros, Oscar Krisen, editor, The Third Mental Measurements Yearbook. New Brunswick: Rutgers University Press, 1949. 1047 pp.

Ficklen, Bessie A., A Handbook of Fist Puppets. New York: Frederick A. Stokes Company, 1935. 329 pp.

Garrett, Henry E., Statistics in Psychology and Education. New York: Longmans, Green and Co., 1947. 487 pp.

Good, Carter Victor, A. S. Barr, and Douglas E. Scates, The Methodology of Educational Research. New York: D. Appleton-Century Company, Inc., 1941. 493 pp.

McCall, William Anderson, How To Experiment In Education. New York: The Macmillan Company, 1923. 281 pp.

Monroe, Walter Scott, editor, Encyclopedia of Educational Research. New York: The Macmillan Company, 1941. 1344 pp.

Mursell, James Lockhart, Psychological Testing. New York: Longmans, Green and Co., 1947. 488 pp.

Symonds, Percival M., Diagnosing Personality. New York: D. Appleton-Century Company, Inc., 1931. 602 pp.

B. PERIODICAL ARTICLES

Crawford, C. C., and Lillian Grey, "Measured Results of Activity Teaching," National Education Journal, 20:270, October, 1931.

Smith, I., "Puppetry in the Classroom," Elementary English Review, 10:219-222, November, 1933.

C. PUBLICATIONS OF ORGANIZATIONS

Puppetry in the Curriculum. Board of Education of the City of New York: Curriculum Bulletin, 1947-1948 Series, No. 1. 171 pp.

D. TESTS

Clark, Willis W., Ernest W. Tiegs, and Louis P. Thorpe, *California Test of Personality*. Los Angeles: California Test Bureau, 1942.

Tiegs, Ernest W., and Willis W. Clark, *Progressive Achievement Test*. Los Angeles: California Test Bureau, 1943.

Ziegler, W. A., *Minnesota Rate of Manipulation Test*. Minneapolis: Educational Test Bureau, 1939.

APPENDIX

APPENDIX A

Related Experiments

APPENDIX A

TABULATED RESULTS OF STANFORD READING TEST, REVISED, AND LOS ANGELES DIAGNOSTIC TEST IN LANGUAGE USED IN THE 1931 LOS ANGELES STUDY*

Items	Reading Vocabulary	Reading Comprehension	Language Usage
Average gain in months	7.8	8.1	8.1
Normal gain in months	5.0	5.0	5.0
Percentage actual of normal gain	150%	163%	163%
Excess of actual over normal gain in terms of months	2.8	3.1	3.1
Standard error of the average excess gain	.97	.76	.58
Odds that excess gain is not due to mere chance	525:1	48,000:1	millions:1

* Crawford, op. cit., p. 270

APPENDIX A

CLAIMED RESULTS OF THE NEW YORK BOARD OF EDUCATION STUDY 1946-1947

An educational program which includes the type of experiences offered by puppetry, will help the pupil to:

- discover and develop his special aptitudes and talents.
- express himself creatively and imaginatively.
- develop and use an effective vocabulary, recognize the need for learning and practicing improved speech patterns, and for speaking with poise.
- extend manipulative skills.
- gain improved knowledge of manual, industrial, and fine arts.
- gain increased skill in work-study techniques.
- experience the feeling of satisfaction and success that accompanies achievement.
- develop individual security by releasing inner tensions through dramatization of experiences related to personal, family, or school problems.
- share worth-while information and special skills.
- develop self-control and consideration for others in the pursuit of a common purpose.
- participate in vitalized experiences in the various major curriculum areas.
- understand and practice meaningful and orderly audience listening and participation.

Puppetry in the Curriculum. Board of Education of the City of New York, Curriculum Bulletin, 1947-1948 Series, No. 1, p. xi.

APPENDIX B

Method of Puppet Construction

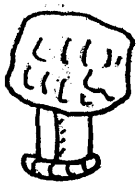
APPENDIX B

METHOD OF PUPPET CONSTRUCTION

Making the core for the Head:

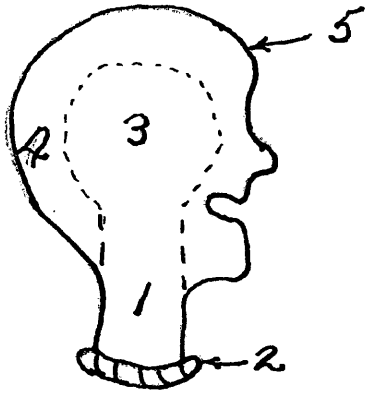
Cardboard Cylinder

Cloth covered



Capped with core of sawdust paste

Modeled Head:



1. Cloth covered cylinder
2. Roll of cloth to sew body to
3. Core of sawdust mixture
4. Head of modeled sawdust mixture
5. Covering of paper mache skin after sawdust is dry

Costume:

The foundation garment is a straight skirt ten to fourteen inches wide seamed to form a cylinder, gathered or plaited at the top, and sewed to roll of cloth on bottom of head.

For right hand puppets, the right sleeve is sewed in one inch down from the neck, the left sleeve two inches from the neck. (For left hand puppets, reverse.) The index finger fits in the head cylinder, the middle finger is used for one arm of the puppet, and the thumb for the other arm.

For most puppets, decoration of the undergarment make up the costume.

APPENDIX C

Resume of Activities

APPENDIX C

RESUME OF ACTIVITIES

Control Group *

Activity	Number of Periods
Map making	5
Attended basketball game	14
Homework	4
Individual Conferences	4
Clean up of room	4
Reading period	10
Cleanout lockers	2
Library	5
Discussion of keeping building clean	1
Language arts drill	2
Played softball	19
Total	70 Periods

* This list of activities, covering the same periods as the Experimental Group, was made by Mr. David Pulley.

APPENDIX C

RESUME OF ACTIVITIES

Experimental Group

Activity	Number of Periods
November 14 - December 7	9
Worked on cores; sawdust mixture modeling; and covering puppet heads.	
December 8 - December 20	7
Worked on scripts; picked names of groups; decided upon the first five productions: *Punch and Judy* (two productions, different scripts) *Hansel and Gretel* *The Three Wishes* *The Mad Tea Party* and painted heads. Group was now ready to make the bodies of puppets after the Christmas holidays.	
January 3 - January 23	9
Finished bodies; started scenery; announced February 9 as production date; worked on costumes; puppet stage made by the investigator delivered; instruction in direction and rehearsing.	
February 1 - February 13	6
Rehearsals. Set production date for February 14 to give more rehearsal time.	
February 14 - February 16	2
Two productions each period to the entire experimental group.	

Activity	Number of Periods
February 20 - February 21	2
Rehearsal and production of the five shows.	
February 23 - March 6	5
Rehearsals for school performances.	
March 7	1
Performance for the grades.	
March 9 - March 10	2
Rehearsal and performance for the high school.	
March 13 - March 30	9
Making second puppets and preparing for the next five productions:	
The Spanish Twins Little Red Riding Hood The Painted Pig The Three Bears Little Pedro	
April 10 - May 4	10
Costumes, scripts, scenery, and properties ready for rehearsal.	
May 8 - May 16	5
Rehearsal with stage.	
May 18 - May 23	3
Five performances for the experimental group. Concluded puppetry activity	
Total	70 Periods

APPENDIX D

Formulas

APPENDIX D

FORMULAS USED IN THE STUDY FOR STATISTICAL COMPUTATIONS

Mean: $$M = \frac{\Sigma X}{N}$$

Standard deviation: $$\sigma = \frac{\sqrt{N\Sigma X^2 - (\Sigma X)^2}}{N}$$

Standard error of mean: $$\sigma_M = \frac{\sigma}{\sqrt{N-1}}$$

Standard error of mean difference:

$$\sigma_{M_1 - M_2} = \sqrt{\sigma_{M_1}^2 + \sigma_{M_2}^2}$$

Critical ratio:

$$C.R. = \frac{D}{\sigma_{M_1 - M_2}}$$

VITA

Albert Haak was born in Keota, Colorado. He received his education in the public schools of Wauwatosa, Wisconsin; in Lawrence College at Appleton, Wisconsin; Milwaukee State Teachers College, Milwaukee, Wisconsin; and William and Mary College at Williamsburg, Virginia.

His professional experience includes four and one-half years as technical director of the Wauwatosa High School and Community Stage; at present he is an instructor in the Fine Arts Department of The College of William and Mary and technical director-designer of The William and Mary Theatre.